



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/566,769

08/21/2006

David Alan Boyd

JMYT-360US

7829

23122 7590 03/09/2009
RATNERPRESTIA
P.O. BOX 980
VALLEY FORGE, PA 19482

EXAMINER

BUI, DUNG H

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

03/09/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/566,769	Applicant(s) BOYD ET AL.	
	Examiner DUNG BUI	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>01/31/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 6-11, 13, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Buchner et al (US 4,214,699).

Regarding claim 1, Buchner et al discloses the claimed invention for a hydrogen supply system (abstract), the system comprising a first hydrogen storage material and a second hydrogen storage material (column 2, lines 14-19), wherein the two hydrogen stores are separate (figure 2); and wherein the first hydrogen storage material can be activated to release hydrogen at a lower temperature than can the second hydrogen storage material (column 2, lines 45-68); wherein at least a proportion of the hydrogen released from the first hydrogen storage material is utilised to activate the second hydrogen storage material; and wherein at least a proportion of the hydrogen released from the second hydrogen storage material is made available to a hydrogen consumption system (figure 2), and wherein the second hydrogen storage material is activated by oxidising a proportion of the hydrogen released from the first hydrogen storage material in a hydrogen burner unit (figure 2 – hydrogen consumption system is inherently a burner unit, ie the motor; column 3, lines 3-21).

Art Unit: 1797

Regarding claim 2, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for wherein a proportion of the hydrogen released from the first hydrogen storage material is made available to the hydrogen consumption system (figure 2).

Regarding claim 6, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for one or more heat exchangers (figure 2, radiator is heat exchanger to remove heat in motor that produced by hydrogen) to remove heat from the hydrogen released from the first or second hydrogen storage materials.

Regarding claim 7, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for wherein the first hydrogen storage material is selected from the group consisting of an AB_5 , an AB_2 , and an AB type material, and any combination thereof (column 2, lines 14-19).

Regarding claim 8, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for the first hydrogen storage material is selected from the group consisting of $LaNi_5$, Al doped $LaNi_5$, $CeNi_5$, Al doped $CeNi_5$, $CaNi_5$, Mn doped $CaNi_5$, TiVMn, Zr doped TiCrMn, Zr doped $TiCr_2$, Co doped TiV_2 , Fe/Ti, Ti/Zr, Ti(MnV) and Ti(MnCr), and any combination thereof (column 2, lines 14-19).

Regarding claim 9, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for wherein the second hydrogen storage material comprises Mg (column 2, lines 14-19).

Art Unit: 1797

Regarding claim 10, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for wherein the second hydrogen storage material further comprises PGM (column 2, lines 14-19; Ni is PGM, since it has the similar physical, chemical properties and the ability to absorb hydrogen like Pd and Pt).

Regarding claim 11, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for wherein the second hydrogen storage material is MgH_2 or $\text{Mg H}_2/\text{Ni}$, or any combination thereof (column 2, lines 14-19).

Regarding claim 13, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for wherein the hydrogen consumption system comprises an internal combustion engine (abstract – motor vehicle has combustion engine).

Regarding claim 15, Buchner et al discloses the claimed invention for a method of activating a second hydrogen storage material for supplying a hydrogen consumption system, which method comprising utilising at least a proportion of a stream of hydrogen generated by activating a separate first hydrogen storage material (column 2, line 45 – column 3, line 21).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1797

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-2, 4-11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buchner et al (US 4,214,699).

Regarding claim 1, Buchner et al discloses the claimed invention for a hydrogen supply system (abstract), the system comprising a first hydrogen storage material and a second hydrogen storage material (column 2, lines 14-19), wherein the two hydrogen stores are separate (figure 2); and wherein the first hydrogen storage material can be activated to release hydrogen at a lower temperature than can the second hydrogen storage material (column 2, lines 45-68); wherein at least a proportion of the hydrogen released from the first hydrogen storage material is utilised to activate the second hydrogen storage material (column 3, lines 3-19); and wherein at least a proportion of the hydrogen released from the second hydrogen storage material is made available to a hydrogen consumption system (figure 2). Buchner et al does not explicitly disclose wherein the second hydrogen storage material is activated by oxidising a proportion of the hydrogen released from the first hydrogen storage material in a hydrogen burner unit. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to provide a secondary motor for backup during maintenance as a

Art Unit: 1797

hydrogen burner unit, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. V. Bemis Co.*, 193 USPQ 8.

Regarding claim 2, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for wherein a proportion of the hydrogen released from the first hydrogen storage material is made available to the hydrogen consumption system (figure 2).

Regarding claim 4, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention except for wherein the first hydrogen storage material can be activated to release hydrogen at a temperature of less than 100°C. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to provide wherein the first hydrogen storage material can be activated to release hydrogen at a temperature of less than 100°C, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claim 5, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention except for wherein the second hydrogen storage material can be activated to release hydrogen at a temperature of from 250°C to 350°C. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to provide the second hydrogen storage material can be activated to release hydrogen at a temperature of from 250°C to 350°C, since it has

Art Unit: 1797

been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claim 6, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for one or more heat exchangers (figure 2, radiator is heat exchanger to remove heat in motor that produced by hydrogen) to remove heat from the hydrogen released from the first or second hydrogen storage materials.

Regarding claim 7, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for wherein the first hydrogen storage material is selected from the group consisting of an AB₅, an AB₂, and an AB type material, and any combination thereof (column 2, lines 14-19).

Regarding claim 8, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for the first hydrogen storage material is selected from the group consisting of LaNi₅, Al doped LaNi₅, CeNi₅, Al doped CeNi₅, CaNi₅, Mn doped CaNi₅, TiVMn, Zr doped TiCrMn, Zr doped TiCr₂, Co doped TiV₂, Fe/Ti, Ti/Zr, Ti(MnV) and Ti(MnCr), and any combination thereof (column 2, lines 14-19).

Regarding claim 9, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for wherein the second hydrogen storage material comprises Mg (column 2, lines 14-19).

Art Unit: 1797

Regarding claim 10, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for wherein the second hydrogen storage material further comprises PGM (column 2, lines 14-19; Ni is PGM, since it has the similar physical, chemical properties and the ability to absorb hydrogen like Pd and Pt).

Regarding claim 11, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for wherein the second hydrogen storage material is MgH_2 or $\text{Mg H}_2/\text{Ni}$, or any combination thereof (column 2, lines 14-19).

Regarding claim 13, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention for wherein the hydrogen consumption system comprises an internal combustion engine (abstract – motor vehicle has combustion engine).

6. Claims 3, 12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buchner et al (US 4,214,699) as applied to claim 1 above in view of Gelsey (US 2003/0162059).

Regarding claim 3, Buchner et al discloses all of limitations as set forth above. Buchner et al discloses the claimed invention except for wherein a proportion of the hydrogen released from the second hydrogen storage material is used to recharge the first hydrogen storage material. Gelsey teaches that it is known to have a proportion of the hydrogen released from the second hydrogen storage material is used to recharge the first hydrogen storage material ([0045]). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to provide a proportion of the hydrogen released from the second hydrogen storage material is used to recharge

Art Unit: 1797

the first hydrogen storage material as taught by Gelsey in order to conserve energy and lower capital cost.

Regarding claim 12, Buchner et al as modified discloses all of limitations as set forth above. Note that Buchner et al as modified discloses the claimed invention for wherein the hydrogen consumption system comprises a fuel cell (Gelsey - abstract).

Regarding claim 14, Buchner et al as modified discloses all of limitations as set forth above. Note that Buchner et al as modified discloses the claimed invention for a power source (Gelsey - abstract).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 20010039803, US 20060003193, US 20070169852, US 20070289882, US 20070297964, US 4385726, US 5753383, US 6591616, US 6627340, US 7306780, US 7405013.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DUNG BUI whose telephone number is (571)270-7077. The examiner can normally be reached on Mon. - Thurs., 7:30 a.m.-5 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on (571)272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1797

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DUANE SMITH/
Supervisory Patent Examiner, Art
Unit 1797

DB